ECOLOGY, EVOLUTION, AND ORGANISMAL BIOLOGY, BIOLOGICAL SCIENCES (BS)

Degree: Bachelor of Science
Major: Biological Sciences
Concentration: Ecology, Evolution, and Organismal Biology
Program Code: 3409

About This Major . . .

The Bachelor of Science degree with a Biological Sciences major provides a broad background in the biological sciences. Students choose biology courses from four categories: cellular, molecular, and developmental biology; anatomical and physiological biology; organismal biology; and ecology, evolution, and systematics. The Ecology, Evolution, and Organismal Biology Concentration will provide a solid background in ecology and evolution, and offers field courses in a variety of areas, in addition to internships and research opportunities. Graduates of this program may pursue careers in ecology, plant biology, fish and wildlife biology, and evolutionary biology, which are just a few of the career options available.

For more information on what you can do with this major, visit Career Services’ What to Do with a Major? (https://www.coloradomesa.edu/career/explore/major.html) resource.

All CMU baccalaureate graduates are expected to demonstrate proficiency in specialized knowledge/applied learning, quantitative fluency, communication fluency, critical thinking, personal and social responsibility, and information literacy. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

1. Demonstrate a broad, comprehensive knowledge of the main areas of biology (including evolution, diversity, ecology, cell biology, and genetics) and the ability to apply this knowledge to address new questions. (Specialized knowledge)
2. Collect and analyze quantitative data and interpret quantitative data presented in primary scientific literature. (Quantitative Fluency/Applied Learning)
3. Utilize science as a way of thinking and problem solving and make key observations, ask questions, formulate hypotheses, design experiments, collect data, draw logical conclusions, and explain and defend those conclusions to others. (Critical Thinking)
4. Demonstrate effective biological communication skills, both in writing and orally. (Communication fluency)
5. Evaluate and defend contrasting viewpoints related to ethical, social, civic, and/or environmental challenges in the field of biological sciences. (Personal Social Responsibility)
6. Critically search, evaluate, and appropriately apply information from primary scientific literature (Information Literacy)

Requirements

Each section below contains details about the requirements for this program. Select a header to expand the information/requirements for that particular section of the program's requirements.

To print or save an overview of this program's information, including the program description, learning outcomes, requirements, suggested course sequencing (if applicable), and advising and graduation information, scroll to the bottom of the left-hand navigation menu and select "Print Options." This will give you the options to either "Send Page to Printer" or "Download PDF of This Page." The "Download PDF of This Page" option prepares a much more concise presentation of all program information. The PDF is also printable and may be preferable due to its brevity.

Institutional Degree Requirements

The following institutional degree requirements apply to all CMU baccalaureate degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- 120 semester hours minimum.
- Students must complete a minimum of 30 of the last 60 hours of credit at CMU, with at least 15 semester hours in major discipline courses numbered 300 or higher.
- 40 upper-division credits (an alternative credit limit applies to the Bachelor of Applied Science degree).
- 2.00 division credits (an alternative credit limit applies to the Bachelor of Applied Science degree).
- A course may only be used to fulfill one requirement for each degree/certificate.
- No more than six semester hours of independent study courses can be used toward the degree.
- Non-traditional credit, such as advanced placement, credit by examination, credit for prior learning, cooperative education and internships, cannot exceed 30 semester credit hours for a baccalaureate degree. A maximum of 15 of the 30 credits may be for cooperative education, internships, and practica.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Degree Requirements.
- The Catalog Year determines which program sheet and degree requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See “Requirements for Undergraduate Degrees and Certificates” in the catalog for a complete list of graduation requirements.

Essential Learning Requirements

(31 semester hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is an Essential Learning option and a requirement for your major, you must use it to fulfill the major requirement and make a different selection for the Essential Learning requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 111</td>
<td>English Composition I-GTCO1</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 112</td>
<td>English Composition II-GTCO2</td>
<td>3</td>
</tr>
<tr>
<td>MATH 113</td>
<td>College Algebra-GTMA1</td>
<td>3</td>
</tr>
</tbody>
</table>

History

Select one History course 3
Humanities
Select one Humanities course 3

Social and Behavioral Sciences
Select one Social and Behavioral Sciences course 3
Select one Social and Behavioral Sciences course 3

Fine Arts
Select one Fine Arts course 3

Natural Sciences
Select one Natural Sciences course 3
Select one Natural Sciences course with a lab 4

Total Semester Credit Hours 31

1 Must receive a grade of "C" or better and must be complete by the time the student has 60 semester hours.
2 This is a 4 credit course. 3 credits apply to the Essential Learning requirements and 1 credit applies to elective credit.
3 7 semester hours, one course must include a lab.

Program Specific Degree Requirements
(51 semester hours, must pass all courses with a grade of "C" or higher)

- Topics courses (BIOL 196/BIOL 296/BIOL 396/BIOL 496) as well as research courses (BIOL 387/BIOL 487), internships (BIOL 499), teaching practicums (BIOL 493), and independent study (BIOL 495) may not be used as Additional Biology Courses but must be used for elective credit.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 208 &amp; 208L</td>
<td>Fundamentals of Ecology and Evolution and Fundamentals of Ecology and Evolution Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 301 &amp; 301L</td>
<td>Principles of Genetics and Principles of Genetics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 483</td>
<td>Senior Thesis</td>
<td>2</td>
</tr>
</tbody>
</table>

Required Related Study Area

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 111 &amp; 111L</td>
<td>General Physics-GTSC1 and General Physics Laboratory-GTSC1</td>
<td>5</td>
</tr>
<tr>
<td>BIOL 106 &amp; 106L</td>
<td>Principles of Animal Biology and Principles of Animal Biology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 107 &amp; 107L</td>
<td>Principles of Plant Biology and Principles of Plant Biology Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 403</td>
<td>Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 405 &amp; 405L</td>
<td>Advanced Ecological Methods and Advanced Ecological Methods Laboratory</td>
<td>5</td>
</tr>
</tbody>
</table>

Additional Biology Courses
Select 20 semester hours, chosen from the lists below. At least 16 hours must be 300-level or above.

Category 1: Cellular, Developmental, and Molecular

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 302</td>
<td>Cellular Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 310 &amp; 310L</td>
<td>Developmental Biology and Developmental Biology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 343</td>
<td>Immunology</td>
<td></td>
</tr>
<tr>
<td>BIOL 344 &amp; 344L</td>
<td>Forensic Molecular Biology and Forensic Molecular Biology Laboratory</td>
<td></td>
</tr>
<tr>
<td>BIOL 371L</td>
<td>Laboratory Investigations in Cellular and Molecular Biology</td>
<td></td>
</tr>
<tr>
<td>BIOL 425</td>
<td>Molecular Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 442</td>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>CHEM 315 &amp; 315L</td>
<td>Biochemistry I and Biochemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 316</td>
<td>Biochemistry II</td>
<td></td>
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</table>

Category 2: Organismal

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 250 &amp; 250L</td>
<td>Introduction to Microbiology-GTSC1 and Introduction to Microbiology Laboratory-GTSC1</td>
<td></td>
</tr>
</tbody>
</table>
BIOL 316 & 316L
Animal Behavior and Animal Behavior Laboratory

BIOL 322 & 322L
Plant Identification and Plant Identification Laboratory

BIOL 331 & 331L
Insect Biology and Insect Biology Laboratory

BIOL 333
Marine Biology

BIOL 335 & 335L
Invertebrate Zoology and Invertebrate Zoology Laboratory

BIOL 336 & 336L
Fish Biology and Fish Biology Laboratory

BIOL 338
Small Mammal Biology

BIOL 350 & 350L
Microbiology and Microbiology Laboratory

BIOL 411 & 411L
Mammalogy and Mammalogy Laboratory

BIOL 412 & 412L
Ornithology and Ornithology Laboratory

BIOL 413 & 413L
Herpetology and Herpetology Laboratory

BIOL 431
Animal Parasitology

BIOL 433
Marine Invertebrate Communities

BIOL 435 & 435L
Invertebrate Zoology and Invertebrate Zoology Laboratory

Category 3: Anatomical and Physiological

BIOL 209 & 209L
Human Anatomy and Physiology and Human Anatomy and Physiology Laboratory

BIOL 210 & 210L
Human Anatomy and Physiology II and Human Anatomy and Physiology II Laboratory

BIOL 241
Pathophysiology

BIOL 351
Ecological Physiology

BIOL 352 & 352L
Human Physiology and Human Physiology Laboratory

BIOL 409 & 409L
Gross and Developmental Human Anatomy and Gross and Developmental Human Anatomy Laboratory

BIOL 410 & 410L
Human Osteology and Human Osteology Laboratory

BIOL 421 & 421L
Plant Physiology and Plant Physiology Laboratory

BIOL 423 & 423L
Plant Anatomy and Plant Anatomy Laboratory

BIOL 441
Endocrinology

Category 4: Ecology, Evolution, and Systematics

BIOL 211 & 211L
Ecosystem Biology and Ecosystem Biology Laboratory

BIOL 315
Epidemiology

BIOL 320
Plant Systematics

BIOL 321 & 321L
Taxonomy of Grasses and Taxonomy of Grasses Laboratory

BIOL 406
Plant-Animal Interactions

BIOL 407
Tropical Field Biology

BIOL 408
Desert Ecology

BIOL 414 & 414L
Freshwater Ecology and Freshwater Ecology Laboratory

BIOL 415
Tropical Ecosystems

BIOL 418 & 418L
Wildlife Management and Wildlife Field Techniques

GIST 305
Cartography for GIS

GIST 332 & 332L
Introduction to Geographic Information Systems and Introduction to Geographic Information Systems Laboratory

GEOG 131
Introduction to Cartography

Total Semester Credit Hours 51

General Electives

All college level courses appearing on your final transcript, not listed above that will bring your total semester hours to 120 hours, including 40 upper-division hours. 13-15 semester hours; up to 10 hours of upper division may be needed. BIOL 499 Internship or research courses are recommended.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>MATH 113</td>
<td>College Algebra-GTMA1</td>
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<tr>
<td></td>
<td>12-14 General Elective Semester Hours</td>
<td>12-14</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td></td>
<td>13-15</td>
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Suggested Course Plan

First Year

Fall Semester

BIOL 105 & 105L
Attributes of Living Systems-GTSC1 and Attributes of Living Systems Laboratory-GTSC1 4

CHEM 131 & 131L
General Chemistry I-GTSC1 and General Chemistry Laboratory I-GTSC1 5

MATH 113 or MATH 151
College Algebra-GTMA1 or Calculus I-GTMA1 3-5

KINE 100
Health and Wellness 1

Semester Credit Hours 14

Spring Semester

BIOL 106 & 106L
Principles of Animal Biology and Principles of Animal Biology Laboratory 4

CHEM 132 & 132L
General Chemistry II-GTSC1 and General Chemistry Laboratory II-GTSC1 5

ENGL 111
English Composition I-GTCO1 3

STAT 200 or MATH 151
Probability and Statistics-GTMA1 or Calculus I-GTMA1 3-5

Semester Credit Hours 15

Second Year

Fall Semester

BIOL 107 & 107L
Principles of Plant Biology and Principles of Plant Biology Laboratory 4

PHYS 111 & 111L
General Physics-GTSC1 and General Physics Laboratory-GTSC1 5

ENGL 112
English Composition II-GTSC1 3

Semester Credit Hours 15

Spring Semester

BIOL 208 & 208L
Fundamentals of Ecology and Evolution and Fundamentals of Ecology and Evolution Laboratory 4

BIOL 301 & 301L
Principles of Genetics and Principles of Genetics Laboratory 4

Semester Credit Hours 15
KINA Activity 1
PHYS 112 General Physics-GTSC1 5
& 112L and General Physics Laboratory-GTSC1

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>Fall Semester</td>
<td>14</td>
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<tr>
<td>BIOL 403 Evolution</td>
<td>3</td>
</tr>
<tr>
<td>Essential Learning - History</td>
<td>3</td>
</tr>
<tr>
<td>ESSL 290 Maverick Milestone</td>
<td>3</td>
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<tr>
<td>ESSL 200 Essential Speech</td>
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<tr>
<td>Additional Biology Courses</td>
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<tr>
<td><strong>Semester Credit Hours</strong></td>
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<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 405 Advanced Ecological Methods</td>
<td>5</td>
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<tr>
<td>&amp; 405L and Advanced Ecological Methods Laboratory</td>
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<tr>
<td>Essential Learning - Social and Behavioral Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences - Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
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<td><strong>Semester Credit Hours</strong></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>16</td>
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<tr>
<td>Additional Biology Courses</td>
<td>7</td>
</tr>
<tr>
<td>Essential Learning - Fine Arts</td>
<td>3</td>
</tr>
<tr>
<td>Essential Learning - Natural Science</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 483 Senior Thesis</td>
<td>2</td>
</tr>
<tr>
<td>Additional Biology Courses</td>
<td>7</td>
</tr>
<tr>
<td>Electives 1</td>
<td>6</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td><strong>120-122</strong></td>
</tr>
</tbody>
</table>

1 Less elective hours may be needed. Adequate elective hours must be taken to bring total semester hours to 120, including 40 upper-division hours.

Advising and Graduation

Advising Process and DegreeWorks

Documentation on the pages related to this program is intended for informational purposes to help determine what courses and associated requirements are needed to earn a degree. The suggested course sequencing outlines how students could finish degree requirements. Some courses are critical to complete in specific semesters, while others may be moved around. Meeting with an academic advisor is essential in planning courses and altering the suggested course sequencing. It is ultimately the student’s responsibility to understand and fulfill the requirements for her/his intended degree(s).

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar’s Office to evaluate progress towards a degree and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar’s Office.

Graduation Process

Students must complete the following in the first two months of the semester prior to completing their degree requirements:

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the “Intent to Graduate” form to the Registrar’s Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found at [http://www.coloradomesa.edu/registrar/graduation.html](http://www.coloradomesa.edu/registrar/graduation.html).

If a student’s petition for graduation is denied, it will be her/his responsibility to consult the Registrar’s Office regarding next steps.